July 5, 1966 E. I. ROBINSKY 3,258,800

CONTINUOUSLY EXTENSIBLE AND ROLL-UP STRUCTURE

Filed Aug. 17, 1964 2 Sheets-Sheet 1

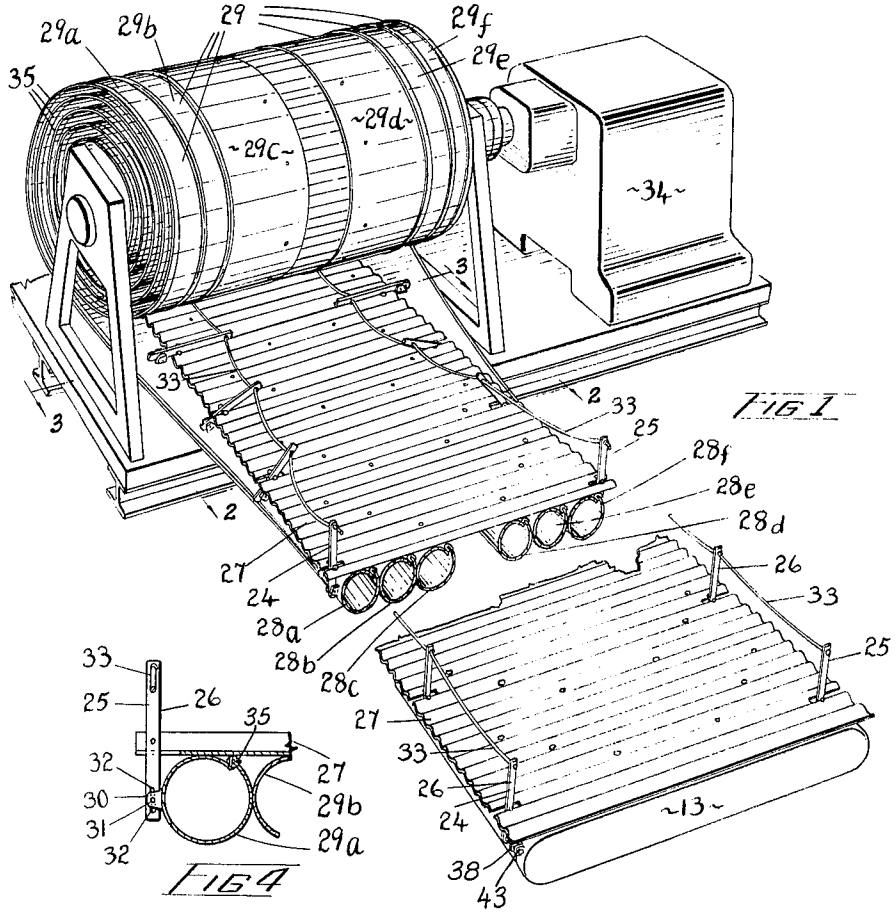

FIG 1

FIG 4

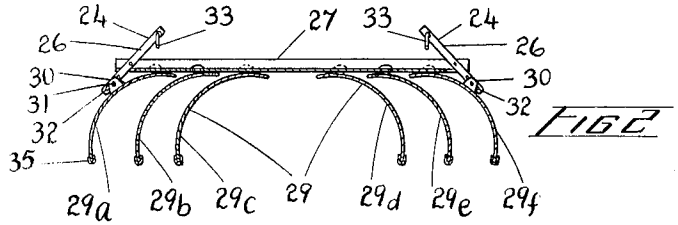

FIG 2

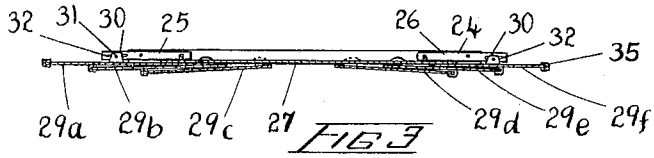

FIG 3

INVENTOR
ELI I. ROBINSKY

BY

ATTORNEY

July 5, 1966 E. I. ROBINSKY 3,258,800

CONTINUOUSLY EXTENSIBLE AND ROLL-UP STRUCTURE

Filed Aug. 17, 1964 2 Sheets-Sheet 2

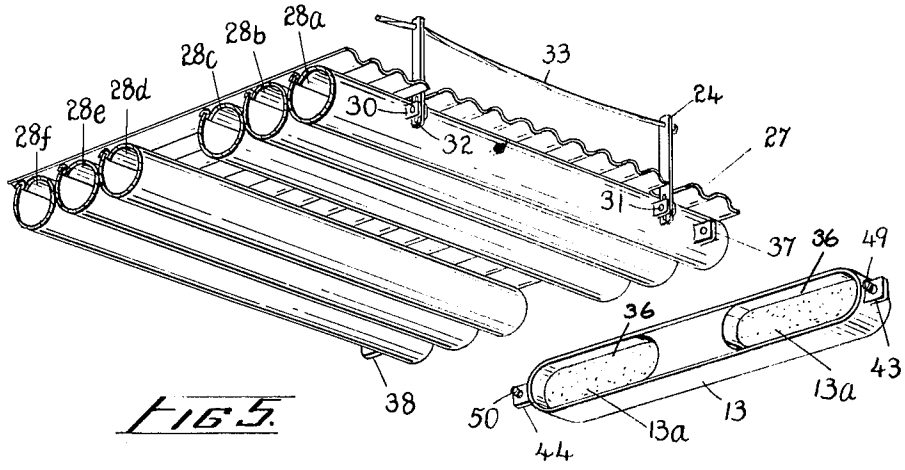

FIG 5.

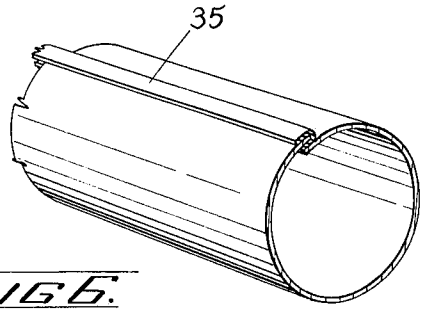

FIG 6.

INVENTOR
ELI I. ROBINSKY
BY
George S. Richardson
ATTORNEY

United States Patent Office

3,258,800

Patented July 5, 1966

3,258,800

CONTINUOUSLY EXTENSIBLE AND ROLL-UP STRUCTURE

Eli I. Robinsky, 301 Jedburgh Road, Toronto, Ontario, Canada

Filed Aug. 17, 1964, Ser. No. 390,078
7 Claims. (Cl. 14—27)

This invention relates to a portable floating structure.

The structure described in this application is an improvement on the floating structure described in co-pending application Serial No. 329,847 filed December 11, 1963.

A portable floating structure of the type described herein is particularly adapted for civilian, military and emergency use when a bridge or a dock is required. Such a structure is also useful for exploration and travel in unsettled territory and may be used to provide a temporary roadway over terrain normally impassable to motor vehicles, such as muskeg and the like.

Numerous types of portable floating structures have been previously proposed and are in use. However, these structures are constructed of many sections which have to be assembled at each new site and disassembled each time they are moved. Also these structures have considerable bulk in their disassembled form and require much handling and space each time they are moved and stored.

The structure of this invention is formed of continuous strips of preformed flexible material having an elastic rebound characteristic such as spring steel which can be quickly and easily rolled, preferably on a drum, and unrolled. Very little assembling is required and the structure is extended by simply unrolling from a drum which may be mounted on a truck. Throughout the specification, the term "material" is restricted to material having the above mentioned characteristics.

This invention is based upon the use of a resilient deck which is supported on floatation members extending along the full length of the longitudinal edge portion of the deck. The floatation members may be formed integrally with the deck by preforming the edge portions as tubes, as herein described or as separate preformed tubes which are permanently secured to the underside of the deck and extending substantially the full length of the deck. When the deck is rolled up, the floatation members, in both embodiments, flatten out to lie in substantially the same plane as the deck. Then, when the deck is unrolled the floatation members reform into tubes. The surface of the deck forms a roadway or path and is made substantially transversely rigid by means either of a separate corrugated surface strip applied on the deck or by corrugating the deck itself depending on whether the floatation members are formed integrally with the deck or as separate units.

Longitudinal rigidity is provided by the floatation members when the deck is unrolled.

The word "floatation" as used herein refers to the support of a body on the upper surface of a liquid or semi-liquid medium.

The accompanying drawings illustrate embodiments of the invention in which

FIGURE 1 illustrates an embodiment of the structure partially rolled on a drum.

FIGURES 2 and 3 are sections of the structure illustrated in FIGURE 1 taken along the lines 2—2 and 3—3 respectively.

FIGURE 4 illustrates detail of a guard-rail mechanism which may be used with the embodiment illustrated in FIGURE 1.

FIGURE 5 illustrates the contruction of the end cap for sealing the end of the tubes.

FIGURE 6 illustrates a sealing means for providing a fluid tight seal along the meeting edges of the tubes.

The structure illustrated in my said co-pending application comprises a deck of thin resilient material which is formed so that the lateral edge portions are coiled to form two floatation chambers, one on each side and which will also provide longitudinal rigidity to the deck, and a corrugated lamina of flexible material fixed to the deck by means such as spot welding with the corrugations running transversely across the strip to provide transverse rigidity. On rolling up the bridge the floatation chambers and **11***b* uncoil and flatten permitting the deck to be rolled up. On unrolling, the structure extends across the water and the floatation members reform to float the deck. In order to prevent the structure from flooding, an end cap is fitted over the end which was projected over the water.

The improvement made by the structure disclosed in the present application comprises a strip of corrugated deck **27** having a plurality of floatation chambers in the form of tubes **28***a, b, c, d, e, f,* formed in the present illustration of thin resilient metal strips **29***a, b, c, d, e, f,* fixed laterally of each other and arranged in rows along the underside of the corrugated deck **27** on each side of the longitudinal center line thereof. Each of the metal strips **29** is fixed to the underside of the deck **27** by means such as rivets along one longitudinal edge portion thereof to the corrugated strip leaving the other edge portion free for the purpose hereinafter described. In the present modification, the three pairs of strips **29***a,* **29***f*; **29***b,* **29***e*; and **29***c,* **29***d* are riveted so that each pair is fastened to a different transverse corrugation as shown in FIGURE 4. Each resilient metal strip is preformed into a longitudinal tube as shown at **28**, FIGURE 1 to form a floatation chamber. On rolling up the structure, the tubes uncoil and flatten in overlapping relationship without interferring with each other as illustrated in FIGURES 2 and 3. The structure may be rolled on a drum operated by a power means **34**.

The number of tubes used and their size will depend on the width of the structure and the loads to be carried. To seal the ends of the tubes an end cap **13** similar to the one described in my said co-pending application and now illustrated in FIGURE 5 is provided. This end cap may be adapted to seal the ends of all the tubes as illustrated or two or more end caps may be used in one structure each end cap being adapted to seal the ends of any number of tubes. The end cap **13** as illustrated, comprises a metal casing of a size to span the end of the bridge which is formed with a pair of sockets **36**, one for each set of three tubes, and a sealing gasket **13***a* at the bottom of each socket. The tube ends are pressed into fluid tight engagement with the sealing gaskets so that water cannot leak into the tubes. Suitable means are provided for removably attaching the cap in place such as brackets **37**, **38**, **42** affixed to ends of the strips forming the outside tubes which, when formed in tubes will register with ears **43**, **44** respectively on the casing **14**, the casing being held in assembled position by bolts **49**, **50**.

Referring to FIGURE 6, for most applications the tubes will be sufficiently water free when sealed as described above. However, if the structure is to be used on very rough water it may be necessary to provide a sealing means **35** along either longitudinal edge of each of the strips **29**. The sealing means **35** may comprise an elongated rubber or plastic strip which is U-shaped in cross-section and which is affixed over one longitudinal edge of each resilient metal strip **29**. The strips **29** are formed so that each of the two longitudinal edges of each strip are in overlapping contact when the tubes are formed. Each tube will provide an essentially water tight compartment if provided with the sealing means **35** and the end cap **13**.

The corrugated deck **27** can be used as a roadway.

Each of the lateral edges of the deck **27** may be provided with guard rails **24** and **25** respectively. The rails comprise posts **26** and flexible ropes or cables **33**. To allow the structure to be rolled up each post **26** of the guard rails **24** and **25** will be pivotally mounted on the corrugated deck **27** so that it may be folded down transversely to the deck and falls into one of the corrugations of the deck. So that the rails will fold down automatically when the bridge is being rolled it is convenient to have a portion of each post **26** extend below the corrugated deck **27** to be operably linked with an outer most resilient metal strip **29***a* or **29***f*. This may be accomplished by providing each of the outer most strips **29** with a series of bifurcated arms **30** one for each post **26**. A pin **31** passes through the bifurcated arm **30** and through a slot **32** at the lower end of the post **26**. Thus when the structure is being rolled up the guard rails **25** will be folded down and the posts will be across the corrugated deck **27** as illustrated in FIGURES 1–4 inclusive.

As described in either of the embodiments the structure of this invention may be wound on a drum. If the drum is mounted on a truck the structure may be readily transported to a site such as a body of water or soft terrain where it is required. The structure may then be extended by simply unrolling from the drum. The only assembling required is to place the end caps on the floatation chambers. Use of this structure therefore provides a means for quickly and conveniently obtaining a floating bridge, dock, roadway or the like.

What I claim as new and desire to protect by Letters Patent of the United States is:

1. A floatable structure adapted to be wound in a roll comprising a substantially long, flat, flexible deck having means stiffening said deck against transverse flexibility without impeding longitudinal flexibility, and a plurality of tube-like floatation chambers, at least one floatation chamber extending longitudinally along each side of the deck and substantially the full length thereof, each chamber being formed of a resilient strip of material preformed into a tubular shape and having one of its longitudinal edges permanently fastened to the deck and having its other edge free permitting the tube to assume a flat position when the structure is wound up into a roll and reform into a tube when the structure is unrolled, and means sealing the ends of each floatation chamber.

2. A floatable structure according to claim **1** wherein said deck has transverse corrugations which provide transverse rigidity.

3. A floatable structure according to claim **1** wherein the two longitudinal edge portions of each strip forming the floatation chamber are in overlapping contact and at least one of the overlapping edges is provided with seal forming means.

4. A floatable structure according to claim **1** having a folding guard rail along each longitudinal edge of the deck, each rail including a plurality of spaced apart posts, each post of said plurality being pivotally attached adjacent the deck edge and having a portion which extends below said deck, said portion being pivotally connected to a point on the periphery of the outermost strip which forms a floatation chamber along the under side of the deck, said plurality of posts reacting with the position of the strip to fold down on and across said deck when the strips flatten as the structure is rolled up and to automatically assume a substantially rigid upright position when the deck is unrolled and the strips reform into tubes.

5. A floatable structure adapted to be wound into a roll comprising a substantially long, flat, flexible deck having means stiffening said deck against transverse flexibility without impeding longitudinal flexibility, and a plurality of tube like floatation chambers secured to the underside of the deck and extending longitudinally thereof on each side of the longitudinal center line of said deck and substantially the full length thereof, each chamber being formed of a strip of resilient material preformed into tubular form and permanently fastened along one of its longitudinal edge portions thereof to the underside of the deck, each strip being arranged to assume a flat position without interference with the other strips when the structure is wound up into a roll and reform into a tubular form when the structure is unrolled, said floatation chambers having removable end cap means sealing the ends thereof.

6. A floatable structure according to claim **5** wherein said deck has transverse corrugations which provide transverse rigidity.

7. A floatable structure according to claim **5** wherein the two longitudinal edge portions of each strip forming the floatation chamber are in overlapping contact and at least one of the overlapping edges is provided with seal forming means.

References Cited by the Examiner

UNITED STATES PATENTS

2,905,282	9/1959	Miller	52—108
3,046,850	7/1962	Tellefson	14—1
3,144,104	8/1964	Weir	52—108

JACOB L. NACKENOFF, *Primary Examiner.*